

Claims 21-35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 21, line 20, the phrase "mixed one another" is non-idiomatic, unclear, vague and indefinite and it should be changed to "mixed with one another".

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 21-23 and 32-34 are rejected under 35 U.S.C. 102(a) or (b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Toda (JP 2000-216150) or Toda (U.S. 6,540,840). Toda (JP 2000-216150) and Toda (U.S. 6,540,840) are patent family equivalents and Toda (U.S. 6,540,840) will be used in this office action an English translation of Toda (JP 2000-216150), and the two references will be both be referred to together in the alternative as Toda. Toda (see Figs. 1, 2A, 2B and 8 for

example) discloses a vaporizer for CVD comprising a plurality of pipes (5a, 5b) for a plurality of raw-material solutions, and a pipe (2) for a carrier gas.

Regarding the claim 21 limitation of "a pipe for a carrier gas, said pipe being provided around an outside of said plurality of pipes so as to contain said plurality of pipes supplying the raw material solutions", it is noted that Fig. 1 of Toda clearly illustrates a plurality of liquid solution supply pipes having openings 6 that are contained in the pipe through which the carrier gas flows, and the outsides of the liquid solution supply pipes are surrounded by the carrier gas pipe.

Also, the leading end of Toda's pipe 2 includes an orifice 7 that is spaced away from the leading ends of pipes 5a and 5b, and a dispersing portion is located between the leading ends of said plurality of pipes 5a and 5b, wherein said dispersing portion is for mixing the plurality of raw material solutions with carrier gas. Also, a vaporizing tube 20 is connected to said leading end of said pipe 2 for the carrier gas via said orifice 7.

Also, Toda (see col. 3, lines 35-47 and col. 9, lines 1-8, for example) specifically states that his apparatus atomizes the liquid raw material solution.

Also, Toda (see col. 6, lines 3-16, for example) teaches the step of providing a cleansing line for using a solvent to clean the portion of the apparatus from the liquid raw material solution supply line up to and including the vaporizing member. The cleansing line and solvent inherently constitutes "a cleaning mechanism cleaning at least one of said dispersing portion said orifice and said vaporizing member".

Also, Toda's apparatus includes a heating means 21.

Lastly, Toda's apparatus is designed to mix a plurality of raw material solutions and a carrier gas at said dispersing portion and then eject the resultant mixture into the vaporizing tube 20. The speed at which the mixture is ejected is a process limitation, and Toda's apparatus is inherently capable of injecting the mixture at a "fast" speed. Further regarding the recited limitation of "ejected to said vaporizing tube at a fast speed", it is noted that "fast" is a relative term, and Toda's apparatus is inherently capable of ejecting the mixture at more than one speed, with one speed being a "fast" speed relative to another "slow" speed.

Claims 21-23 and 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toda (JP 2000-216150) or Toda (U.S. 6,540,840), and taken in further view of Sun (2002/0192375) and Payne (EP 058571).

Toda doesn't specifically describe how his cleansing line is connected to his vaporizer apparatus. Therefore, Sun (see Fig. 7) has been cited to provide a specific example of how a solvent cleansing line can be connected to constitute a cleansing line for using a solvent to clean the portion of the apparatus from the liquid raw material solution supply line up to and including the vaporizing member. If, for argument's sake, Toda alone were not considered to include the claimed cleaning mechanism, it would have been obvious to one skilled in the art to provide the apparatus of Toda with a cleaning line in the manner illustrated in Fig. 7 of Sun for the desirable purpose of accomplishing the cleaning step desired by Toda.

Also, Payne (see Fig. 6) describes a conventional atomizer and vaporizer for vaporizing CVD precursor liquids. In Fig. 6 of Payne, the leading end of the pipe for

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supplying liquid CVD precursor extends into the carrier gas flow in the carrier gas pipe. If, for argument's sake, Toda's pipe for a carrier gas were not considered to be provided around the outside of said plurality of raw material solution pipes so as to contain said plurality of raw material solution pipes, it would have been obvious to one skilled in the art to extend the leading ends of Toda's raw material solution pipes into the carrier gas flow in the manner illustrated by Payne, because Payne teaches that this arrangement will successfully atomize and vaporize liquid CVD precursor material as desired by Toda. In that case, Toda's pipe for a carrier gas would be provided around the outside of said plurality of raw material solution pipes so as to contain said plurality of raw material solution pipes as claimed in claim 21.

Claims 25-27, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toda (JP 2000-216150) or Toda (U.S. 6,540,840), alone or in view of Sun (2002/0192375) and Payne (EP 058571) for the reasons discussed above, and taken in further view of Schmitt (6,098,964). Schmitt (see Fig. 1 and the abstract, for example) teaches that a vaporizer for CVD can be monitored for clogging by monitoring the pressure of a carrier gas being supplied to the vaporizer. It would have been obvious to one skilled in the art to provide the carrier gas line of Toda's vaporizer with a pressure gauge to monitor the carrier gas pressure, because Schmitt teaches that this is a good way to monitor a CVD vaporizer for detecting clogging.

Claims 24 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toda (JP 2000-216150) or Toda (U.S. 6,540,840), alone or in view of Sun (2002/0192375) and Payne (EP 058571) for the reasons discussed above, and taken in

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further view of Agarwal (6,258,171). Agarwal (see the Fig. and the abstract) teaches that it is desirable to provide a plurality of vaporizers for CVD so that one of the plurality of vaporizers can be taken out of service for cleaning, while another one of the plurality of vaporizers is used to supply vapor to a CVD reaction chamber. The vaporizers can be swapped so that vapor is continuously supplied to the CVD reaction chamber. It would have been obvious to one skilled in the art to modify the apparatus of Toda by providing it with plural vaporizers in the manner taught by Agarwal, so that one vaporizer can be taken out of service for cleaning, while another vaporizer is used to supply vapor to a CVD reaction chamber, and in that way the apparatus of Toda can gain the desirable advantage of continuous cleaning as taught by Agarwal.

Claims 28 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toda (JP 2000-216150) or Toda (U.S. 6,540,840), alone or in view of Sun and Payne (EP 058571) (2002/0192375) and taken in further view of Schmitt (6,098,964) for the reasons discussed in the rejection of claims 25-27, 29 and 30 above, and taken in further view of Agarwal (6,258,171). Agarwal (see the Fig. and the abstract) teaches that it is desirable to provide a plurality of vaporizers for CVD so that one of the plurality of vaporizers can be taken out of service for cleaning, while another one of the plurality of vaporizers is used to supply vapor to a CVD reaction chamber. The vaporizers can be swapped so that vapor is continuously supplied to the CVD reaction chamber. It would have been obvious to one skilled in the art to modify the apparatus of Toda by providing it with plural vaporizers in the manner taught by Agarwal, so that one vaporizer can be taken out of service for cleaning, while another vaporizer is used to

supply vapor to a CVD reaction chamber, and in that way the apparatus of Toda can gain the desirable advantage of continuous cleaning as taught by Agarwal.

Applicant has argued that Toda does not teach the claim 21 limitation of "a pipe for a carrier gas, said pipe being provided around an outside of said plurality of pipes so as to contain said plurality of pipes supplying the raw material solutions". It is noted, however, that Fig. 1 of Toda clearly illustrates a plurality of liquid solution supply pipes having openings 6 that are contained in the pipe through which the carrier gas flows, and the outsides of the liquid solution supply pipes are surrounded by the carrier gas pipe.

Also, if, for argument's sake, Toda's pipe for a carrier gas were not considered to be provided around the outside of said plurality of raw material solution pipes so as to contain said plurality of raw material solution pipes, it would have been obvious to one skilled in the art to extend the leading ends of Toda's raw material solution pipes into the carrier gas flow in the manner illustrated by Payne, because Payne teaches that this arrangement will successfully atomize and vaporize liquid CVD precursor material as desired by Toda. In that case, Toda's pipe for a carrier gas would be provided around the outside of said plurality of raw material solution pipes so as to contain said plurality of raw material solution pipes as claimed in claim 21.

Applicant has argued that "Toda has a problem such that it cannot atomize a raw material solution". It is noted, however, that Toda (see col. 3, lines 35-47 and col. 9, lines 1-8, for example) specifically states that his apparatus atomizes the liquid raw material solution, And therefore applicant's argument is not persuasive.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Bueker whose telephone number is (571) 272-1431. The examiner can normally be reached on 9 AM - 5:30 PM, Monday-Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Richard Bueker/
Primary Examiner, Art Unit 1792